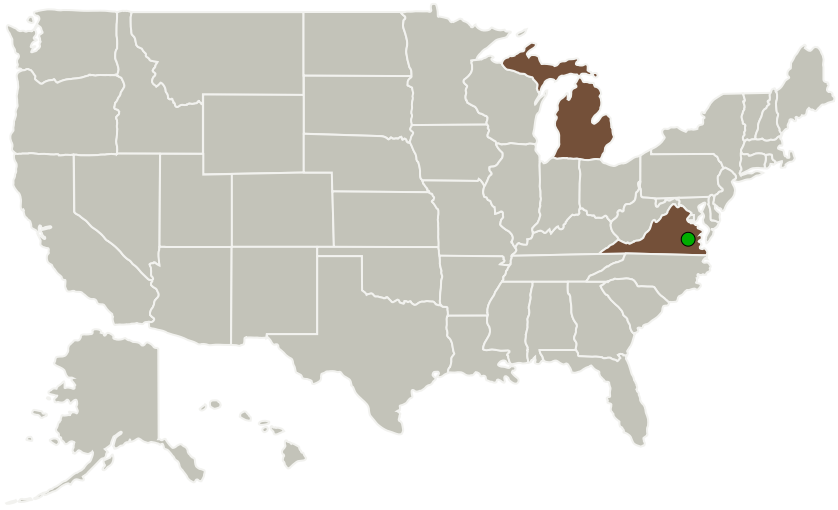
Ultrasonic Additive Manufacturing for Efficient Space Vehicles, Phase II

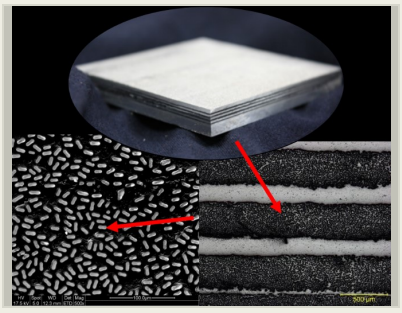
Completed Technology Project (2016 - 2018)

Project Introduction

The goal of this Phase II SBIR program is to demonstrate the application of Ultrasonic Additive Manufacturing (UAM) solid state metal 3D printing to create new and innovative of metal matrix composites for selective reinforcement and lightweighting. Our intent is to enable Space Launch System structures with superior mechanical properties and increased reliability, and validate these advancements with third party testing. Specifically, this effort will develop lightweight and multifunctional composite components in aerospace aluminum alloys, selectively reinforced with metal matrix composite, and study the effect of embedding on structural integrity using UAM-embedded mechanical strain gauges. With NASA guidance, the project team Phase II plan is to select and develop functional prototypes of Space Launch System structures to illustrate efficient space vehicle concepts. A demonstration unit will be delivered to NASA for testing at the completion of the Phase II contract.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Sheridan Solutions, LLC	Lead Organization	Industry Veteran-Owned Small Business (VOSB)	Saline, Michigan
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Michigan	Virginia

Project Transitions

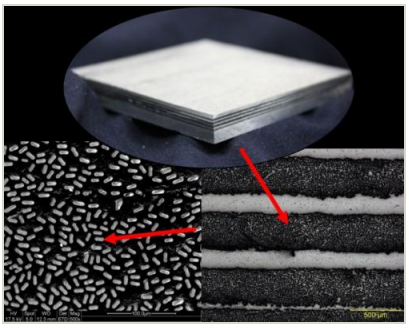
April 2016: Project Start

April 2018: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139735)*

Images



Briefing Chart Image
Ultrasonic Additive Manufacturing for Efficient Space Vehicles, Phase II
(https://techport.nasa.gov/image/132274)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Sheridan Solutions, LLC

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
John J Sheridan

Co-Investigator:
John T Sheridan

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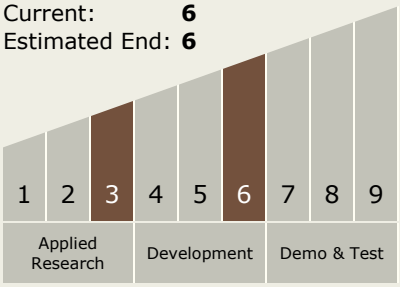
Technology Maturity (TRL)

Start: **3**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.4 Manufacturing
    - TX12.4.1 Manufacturing Processes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System